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Comparative study of primary metabolites in different plant parts of *Clitoria ternatea Linn*

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ABSTRACT

In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Use of plants based drugs and chemicals for curing various ailments and personal adornment is as old as human civilization. The goal of research work is to estimate primary metabolites such as protein, lipids, starch, phenol, and carbohydrates in different plant parts which are present in different proportion in plant Clitoria ternatea. The highest amount of soluble sugar was observed 40.92 mg/100g in stem of C. ternatea, protein 13.96 mg/100g in seed of Clitoria ternatea, carbohydrates 36.24 mg/100g in stem of Clitoria ternatea, Total Ash 9.95 mg/100g leaf of Clitoria ternatea and lipid 12.3 mg/100g seed of Clitoria ternatea, similarly lowest amount of sugar was observed 36.45 mg/100g in seed of Clitoria ternatea, protein 8.81mg/100g in stem of Clitoria ternatea, carbohydrates 30.13 mg/100g in seed of Clitoria ternatea, Total Ash 4.16 mg/100g seed of Clitoria ternatea and lipid 6.9 mg/100g stem of Clitoria ternatea.

Key words: *Clitoria ternatea*, lipid, primary metabolites, protein, soluble sugar, Ash.

INTRODUCTION

For centuries, mankind is totally dependent on plants as source of carbohydrates, proteins and fats for food and shelter. In addition, plants are a valuable source of a wide range of primary metabolites and primary and secondary metabolites, which are used as pharmaceuticals,

agrochemicals, flavours, fragrances, colours, biopesticides and food additives. Over 80% of the approximately 30,000 known natural products are of plant origin. The number of known chemical structures is estimated to be nearly fourfold greater than that in the microbial kingdom. In 1985, of the 3500 new chemical structures identified, 2600 came from the higher plants. Worldwide, 121 clinically useful prescription drugs are derived from plants (1). Plants will continue to provide novel products as well as chemical models for new drugs in the coming centuries, because the chemistry of the majority of plant species is yet to be characterized. The advent of chemical analyses and the characterization of molecular structures have helped in precisely identifying these plants and correlating them with their activity under controlled experimentation. Despite advancements in synthetic chemistry, we still depend upon biological sources for a number of secondary metabolites including pharmaceuticals. Their complex structural features are difficult to synthesize (2).

Elaborative pathways from basic primary metabolites, which are synthesized immediately as a result of photosynthetic activity, produce secondary metabolites. Many of them are unique to the plant kingdom and are not produced by microbes or animals. However, with the advancement of transgenic research, it is possible to produce compounds and molecules, which were also not originally synthesized in plants (2).

C. ternatea L. belongs to the family Fabaceae and is distributed in tropical Asia, Philippines Islands and Madagascar. It is an ornamental perennial climber with conspicuous blue or white flowers, and in India it is commonly called butterfly pea (3). It is a highly palatable forage legume, generally preferred by live stock over other legumes. It is also used as a cover crop or green manure. The root is used in the treatment of various diseases, like indigestion, constipation, arthritis and eye ailments. It is also employed in cases of ascetics, enlargement of the abdominal viscera, sore throat, skin diseases, etc. (3-4). The root, stem and flower are recommended for the treatment of snake-bite and scorpion-sting. The extract of *C. ternatea* was found to have anxiolytic, antidepressant, anticonvulsant and antistress properties. The United State Development Agency (USDA) intends to conserve C.*ternatea* along with other 16 leguminous species with potentially useful phytochemical (4). However, pharmaceuticals companies largely depends upon material collected from natural stands. Due to unrestricted large-scale exploitation of these natural resources, coupled with limited cultivation and insufficient attempts for its replenishment, the wild stock of this species has been markedly depleted, so now it is listed as a rare species by the International Union for Conservation of Nature and Natural Resources (IUCNNR) (5-6). It is also useful in the treatment of severe bronchitis, asthma and hectic fever and is used by the local tribal people to cause abortion; paste is applied for curing abdominal swellings.

Primary metabolites are of prime importance and essentially required for growth of plants for example; sugars, protein, lipids, starch, Ash. Many primary metabolites lie in their impact as precursors or pharmacologically active metabolites in of pharmaceutical compounds such as antipsychotic drug (7-8). The present work is to analyze primary metabolites which are directly concerned with metabolic processes like respiration, photosynthesis, protein and lipid synthesis.

EXPERIMENTAL SECTION

Source of plant material

The plant material was identified by the Annamalai University, Annamalai Nager and a voucher specimen of the same was deposited in the herbarium of the Annamalai University.

Methods: for the quantitative estimation of primary metabolites different protocols were used. Leaves, stems and seeds of the plants were collected, washed with distilled water, shade dried and powdered. The powder was used for analysis of Total Sugar, Protein, Carbohydrate, Total Ash and Lipid (9-12).

RESULTS

C. ternatea were evaluated quantitatively for the analysis of Total Sugar, Protein, Carbohydrate, Total Ash and Lipid.

Table 1 Concentration of primary metabolites of *Clitoria ternatea* (mg/100g)

SI.No.	Name of the Analysis	Seed	Stem	Leaf
1.	Total Sugar mg/100g	36.45	40.92	37.01
2.	Protein mg/100g	13.96	8.81	9.62
3.	Carbohydrate mg/100g	30.13	36.24	32.41
4.	Total Ash mg/100g	4.16	4.18	9.95
5.	Lipid mg/100g	12.3	6.9	7.1

mg/100g=milligram per 100gram

DISCUSSION

In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Plants are rich sources in flavouring, fragrances, insecticides; sweeteners and natural dyes (13).carbohydrates are one such group of carbon compounds which are essential to life. Almost all organisms use carbohydrates as building blocks of cells and as a matter of fact, exploit their rich supply of potential energy to maintain life. The highest amount of carbohydrate was observed in stem of *C. ternatea* 36.24 mg/100g and the highest amount of total sugar was observed in stem of *C. ternatea* 40.92 mg/100g.

Total level of protein was found to be higher in protein in seed of *C. ternatea* 13.96 mg/100g.proteins are the beginners and builders of biochemical reactions. These are the integral part of protoplasm vary in their contents from plant to plant which is dependent on the growth and differentiation of plants (14).

The total levels of lipids were found to be higher in seed of *C. ternatea* 12.3 mg/100g. Lipids are the supporters and storage molecules of cells. These are gresy materials which play important

cellular structures. Lipids are being used by industry as highly stable lubricant and as a renewable source of fuel (15) and the Total Ash 9.95 mg/100g leaf of *C. ternatea.*

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